CLAIMS:

1. A method for charging an energy storage device associated with a defibrillator, the method comprising:

applying current to a primary coil in a flyback transformer;

sensing an average current through the flyback transformer;

controlling the applied current to cause the average current to follow a reference current; and

transferring energy from the flyback transformer to the energy storage device.

2. The method of claim 1, wherein controlling the applied current to cause the average current to follow a reference current comprises:

determining the difference between the average current and a reference current; and

controlling the applied current as a function of the difference.

3. The method of claim 2, wherein controlling the applied current to cause the average current to follow a reference current further comprises:

generating an error signal as a function of the difference;

comparing the error signal to a time-varying clock signal;

generating a modulation signal as a function of the comparison; and

controlling the applied current with the modulation signal.

4. The method of claim 1, wherein transferring energy to the energy storage device comprises charging a capacitor.

5. The method of claim 4, further comprising adjusting the reference current as a function of the voltage across the capacitor.

6. The method of claim 1, further comprising supplying the applied current from a voltage source.

7. The method of claim 6, further comprising adjusting the reference current as a function of the voltage across the voltage source.

8. The method of claim 1, wherein sensing an average current through a flyback transformer comprises:

sensing the current through the primary coil of the transformer; and

sensing the current through a secondary coil of the transformer.

9. The method of claim 8, wherein sensing an average current through a flyback transformer further comprises summing the current through the primary coil and the current through the secondary coil.

10. A device for charging an energy storage device associated with a defibrillator, the device comprising:

an energy source; and

a charging circuit that transfers energy from the energy source to an energy storage device, the charging circuit including a flyback transformer, wherein the charging circuit transfers energy to the energy storage device as a function of the average current in the flyback transformer.

11. The device of claim 10, wherein the energy storage device comprises a capacitor.

12. The device of claim 10, wherein the energy storage device comprises a capacitor bank.

13. The device of claim 10, wherein the energy source comprises a battery.

14. The device of claim 10, wherein the energy source comprises a regulated dc source.

15. The device of claim 10, further comprising:

electrodes for delivering a defibrillation pulse to a patient; and

a switch that couples the electrodes to the energy storage device to deliver the defibrillation pulse.

16. The device of claim 10, further comprising a switch that regulates current applied to a primary coil in a flyback transformer.

17. The device of claim 16, further comprising a controller that controls the switch to cause the average current to follow a reference current.

18. The device of claim 17, wherein the controller comprises:

a summer that generates an average current as a function of the sum of the applied current and a current in a secondary coil in the flyback transformer;

a difference circuit that generate an error signal as a function of the difference between the average current and a reference current; and

a comparator that compares the error signal to a time-varying clock signal and generates a modulation signal as a function of the comparison.

19. The device of claim 17, wherein the controller comprises a processor that controls generation of a reference current.

20. The device of claim 10, further comprising:

a first sensor that senses the current in a primary coil of the transformer; and

a second sensor that senses the current in a secondary coil of the transformer.

21. A medical device comprising:

a transformer;

an energy source that supplies energy to a primary coil of the transformer;

a switch that regulates the supply of energy to the primary coil;

an energy storage device that receives energy from a secondary coil of the flyback transformer; and

a controller that controls the switch as a function of the average current in the transformer.

22. The device of claim 21, further comprising a diode interposed between the energy storage device and the secondary coil of the flyback transformer to prevent discharge of energy from the energy storage device.

23. The device of claim 21, wherein the energy storage device comprises a capacitor.

24. The device of claim 21, further comprising:
a first sensor that senses the current in the primary coil; and
a second sensor that senses the current in the secondary coil.

25. The device of claim 24, wherein the first sensor supplies a primary signal to the controller as a function of the current sensed in the primary coil, and the second sensor supplies a secondary signal to the controller as a function of the current sensed in the secondary coil.

26. A medical device comprising:
a difference circuit that generates an error signal as a function of the difference between a reference current and an average current in a transformer that transfers energy to an energy storage device;
a modulator that modulates the duty cycle of a control signal as a function of the error signal; and
a switch that regulates the supply of energy to a primary coil of the transformer according to the control signal.

27. The device of claim 26, wherein the control signal has a constant period.

28. The device of claim 26, wherein the modulator comprises:
a clock signal generator that generates a clock signal; and

a comparator that generates the control signal according to the relative magnitudes of the clock signal and the error signal.

29. The device of claim 28, wherein the clock signal comprises a periodic ramp signal.

30. The device of claim 26, further comprising a driver that operates the switch according to the control signal.

31. The device of claim 26, further comprising a processor that generates the reference current.

32. The device of claim 31, wherein the processor generates the reference current as a function of the energy transferred to the energy storage device.